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Dual Problem of FPTP Electoral Systems: Evidence from the Indian States

Vivek Jadhav*

Abstract

Democracy across the world has witnessed the evolution of the electoral system. First-Past-The-Post (FPTP), practiced in India has certain disadvantages in terms of disproportionate representation. This paper aims to construct the Gallagher Index, Gini Coefficient, and Generalized Entropy Index to measure and analyse the political concentration and inefficiency that characterise such disproportionate representation. The Gallagher Index measures the disproportionality between seat share and vote share; as it captures the disproportionality between votes received and seats won in the house. This can be viewed as a measure of inefficiency in representing the population, inasmuch as parties with a low vote share can have a high seat share. In other words, even though voters are not preferring the particular party or set of parties, these parties can still get enough seats to govern the particular state. Further, this paper tries to build the association between inefficient representation and concentration of power. We show that the high level of inefficiency in representation observed in the Indian State Assemblies is associated with the concentration of power at the state government level. We suggest that since FPTP in Indian democracy is associated with the dual problems of inefficiency and concentration, alternatives to FPTP should be considered.

Keywords: Inefficient Representation, Gallagher Index, Generalized Entropy Index, Concentration of Power

JEL: D72, K16, H11, P48

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* Vivek Jadhav is pursuing a Ph.D. in Economics from Madras School of Economics, Chennai.

I Introduction

Recent literature in political science as well as in social science focuses on the role of institutions in political as well as economic development. North (1991) defines institutions as the 'rules of the game' in society; more specifically, as humanly devised constraints that shape human interaction. Similarly, Ostrom (2009) defines an institution as the prescription used by humans to organize all forms of repetitive and structured interactions within rule-structured situations. These definitions include rules of the game, which create constraints on human behaviour, as well as incentives (through which institutions exert their influence.) As far as constraints are concerned, it consists of both informal constraints like sanctions, taboos, and customs, as well as formal constraints such as laws.

Democracy, in its broadest sense, refers to rule by the people. In narrow terms, democracy is defined as a collection of institutional structures, designed to reach decisions on public problems, and to promote effective governance, which includes realisation of liberty and equality (Morlino, 2004; Shi and Lu, 2010). Almost all definitions highlight the importance of the electoral system. The electoral system is the political institution that shapes the behaviour of key players in a democracy. Therefore, the electoral system plays an important role in the survival as well as the revival of the democracy, as it translates votes into seats, which become the basis for government formation.

As the electoral system translates votes into seats, it affects the formation of parties, the nature of government, and the behaviour of voters. The electoral system consists of factors like the electoral formula used for electing the representatives, ballot structure, and the number of representatives elected. These factors decide who will run the government, and how power will be transferred from one government to the next.

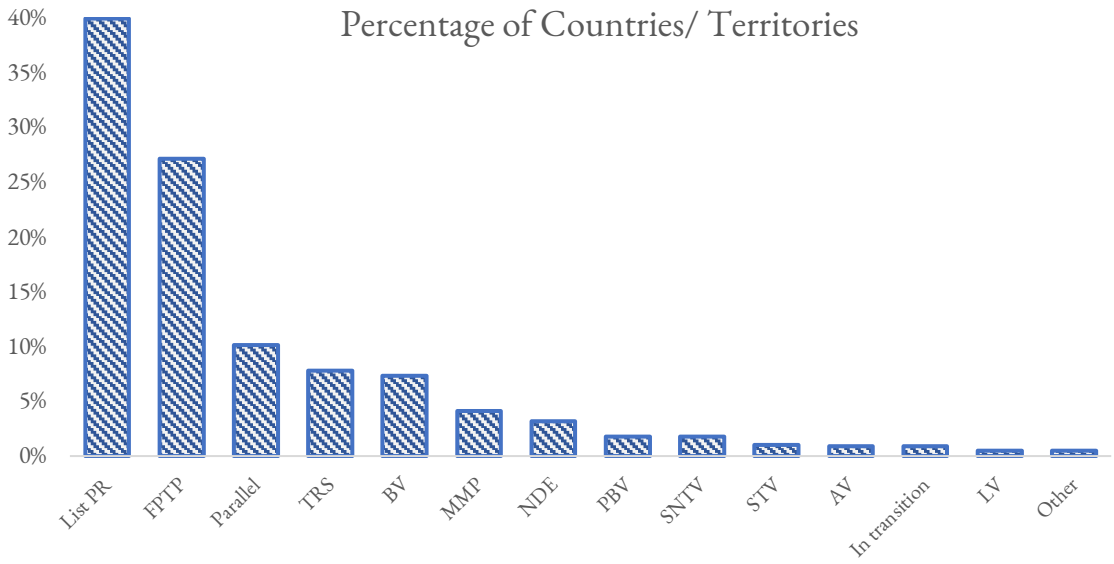
Even given a certain electoral system and design, its impact on the political system may be different, as the impact of the electoral system is influenced by "outside factors" such as ideological, regional, ethical as well as class factors, as also the nature and age of the democracy (Reynolds, Reilly and Ellis (2008)). Therefore, the electoral system has an important role in "meaningful election[1]" as well as post-election government formation and governance.

What is a meaningful election? Reynolds, Reilly and Ellis (2008) suggest that for a meaningful election, the elected representatives should have a role in the formation of the government as well as in the policy formation. The electoral system is mainly divided into three categories: Plurality/Majority, Mixed, and Proportional Representation (Reynolds, Reilly and Ellis (2008))[2]. Further classification can be done. For instance, Figure 1 suggests that around 40% of the countries which go through election use a list proportional representation system. India follows the First Past the Post (FPTP) system. FPTP fits in Majority system. FPTP is viewed as the simplest form of the electoral system, as each voter can give only one vote, and the candidate with the highest number of votes wins, even if they do not have the absolute majority in the constituency.

FPTP does have disadvantages. FPTP favours major parties, and can exclude small and regional parties, which means the FPTP system tends to create a single party which forms the government3. Gallagher and Mitchell (2005) suggest that proportional representation (PR) leads to a multiparty system; however, it may not give direct representation for localities, especially in countries like the Netherlands (where PR is implemented with one constituency covering the whole country.) They

argue that FPTP gives direct representation for localities but with disproportionality, whereas PR provides proportionality but without direct representation to localities.

Figure 1: Electoral System for National Legislature



Source: International IDEA databases (In 2021)[4]

Abbreviations:

List PR	List Proportional representation	**NDE**	No Provision for Direct Elections
FPTP	First Past the Post	**PBV**	Party Block Vote
TRS	Two-Round System	**SNTV**	Single Non- Transferable Vote
BV	Block Vote	**STV**	Single Transferable Vote
MMP	Mixed Member Proportional System	**AV**	Alternative Vote
LV	Limited Vote		

FPTP also creates a discrepancy between the vote share obtained by the parties and the seat share they win. In terms of preferences, voters may not vote for optimal preference in the FPTP system, in order to avoid 'wastage' of their vote (Monroe (1995)). Such behaviour by voters creates a problem for small parties. As far as Indian democracy is concerned, despite the FPTP system being implemented, small and regional parties are well-established and continue to survive – an exception to Monroe's conclusions. But Indian democracy does witness the discrepancy between vote share and seat share.

Duverger (1959) also discusses how electoral system affect the election outcome. Duverger's 'Three Laws of the Effects of Electoral Systems' are that:

1. Proportional representation tends to lead to the formation of many independent parties,
2. The two-ballot majority system tends to lead to the formation of many parties that are allied with each other,
3. The plurality rule tends to produce a two-party system.

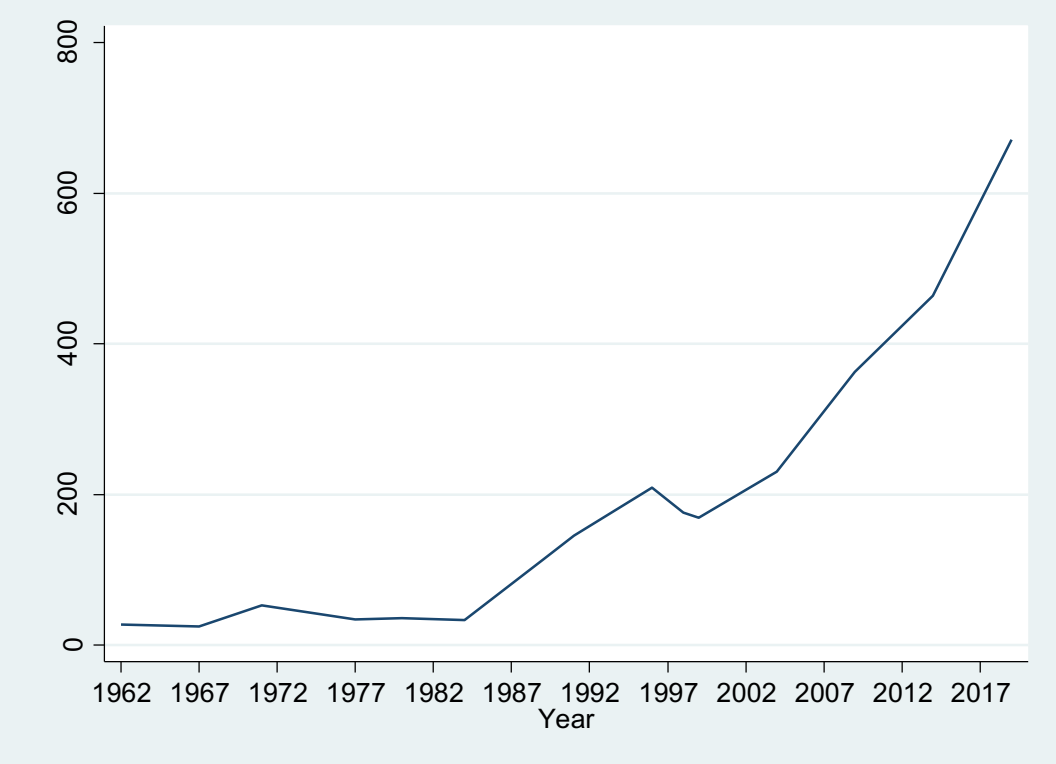
Duverger (1959) does highlight that FPTP (which is a subset of Plurality Rule systems) tends to produce a two-party system. India, on the contrary, has a multiparty system – albeit with high level of

disproportionality, where one party tends to emerge as dominant after votes are translated into seats (Sartori (1986), Chhibber and Murali (2006)).

Figure 2 suggests that the number of political parties is increasing rapidly over a period of time. With coalitions and alliances, the number of parties forming the government is also increasing. This trend is contrary to what we expect from an FPTP system, as the multiparty structure is developing. More precisely, Chhibber and Murali (2006) find that Duverger's law gets violated in states like Bihar and Uttar Pradesh (Hindi Belt), whereas in Southern states, the situation is close to Duverger's law. Chandra (2007) suggests that ethnic identity can be a reason for high number of parties in Uttar Pradesh (which violates Duverger's law.) The geographically concentrated minority parties can also play an important role.

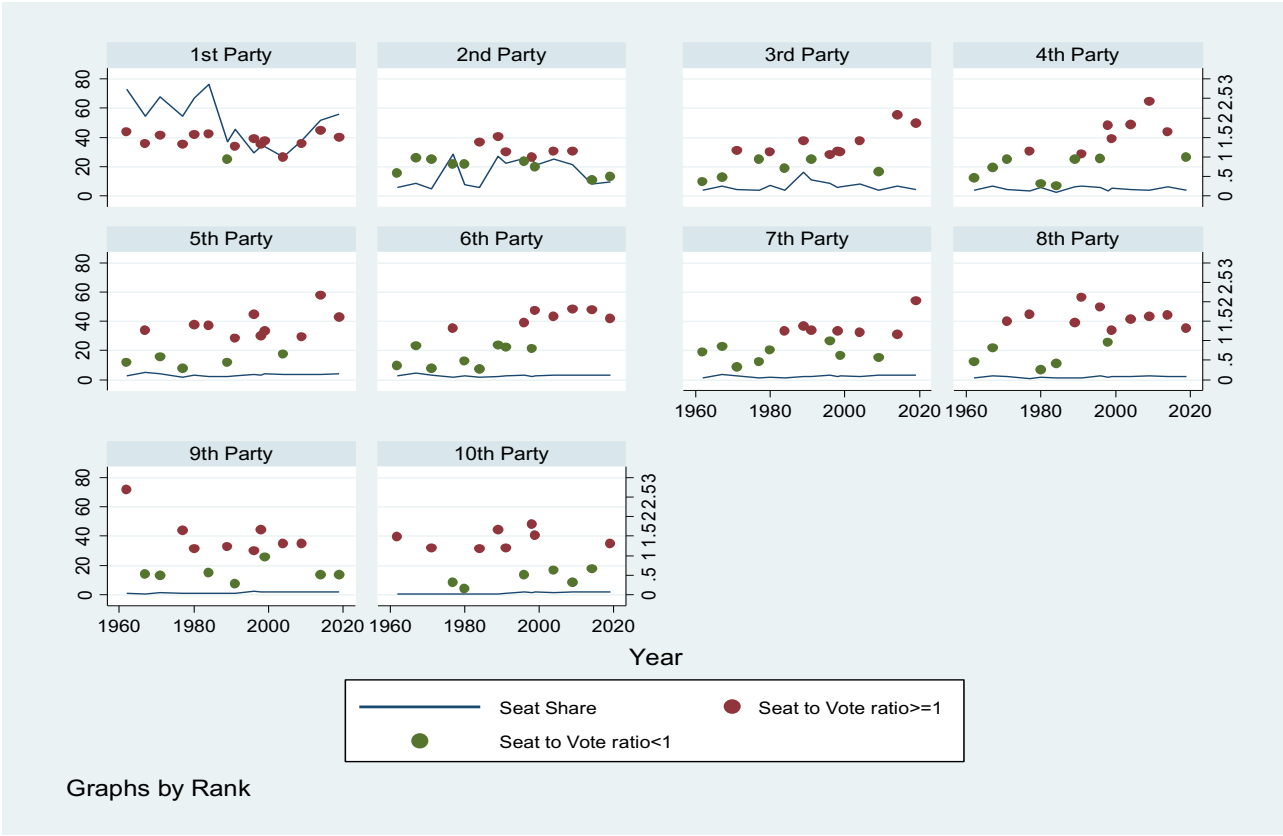
The important question is thus whether, in multiparty systems, there is 'a coexistence of disproportionality and dominant party'. If it exists then it means with smaller vote shares, parties have won the seats; the parties with the highest seats have formed the government, despite not having received the majority of votes. In fact, majority of voters may not have voted for the winning party. Therefore, it becomes important to understand and analyse such coexistence of disproportionality and dominance of a party. Such dominance of a party is referred to as 'concentration power'. To have majority in house, if coalition of parties is inevitable, then it means there is no concentration power at one party. But if a party has a majority in a house, then it means it has a dominance in forming the government, which suggests that there is a concentration of power in that particular party.

Figure 2: Total Number of Political Parties (including national, state, and registered (unorganized) parties.)



Data source: Election Results, Full Statistical Reports, the Election Commission of India (https://eci.gov.in/statistical-report/statistical-reports/)

Figure 3: Seat shares and Seat to Vote ratio of top ten political parties



Data source: Election Results, Full Statistical Reports, the Election Commission of India (https://eci.gov.in/statistical-report/statistical-reports/)

Figure 3 on the other hand suggests that most of the time, the ratio of seats won to vote received by political parties is more than 1, which means the seat share of the top parties[5] is higher than the vote share they receive. The lowest seat share obtained by the first party is 26.7%, whereas the highest seat share obtained by the first party is 76.52%. The mean seat share obtained by the first party is 49.7%. This suggests that there is both disproportionality and concentration of power in the winning party.

Taagepera and Shugart (1989) also suggests that the FPTP suffers from the problem of 'overamplification', which is when a small shift in vote share can generate drastic changes in seat share. Overamplification can be seen as a biproduct of disproportionality, in that disproportionality means that a candidate with a small vote share can manage to win, and hence a small change in vote share can change that result.

Tillin (2015) finds disproportionality in national elections in India. The Law Commission of India 2015 Report on electoral reforms also highlights the disproportionality problem; that said, it finds that even if the FPTP system supports the dominance of the winning party, even such a dominant party can't uphold majoritarianism in a multiparty system, because a candidate who receives as little as 20-30% of vote share can manage to win[6]. Similarly, the Report of the Committee on Electoral Reforms, 1990 shows disagreements among the members regarding the continuation of the FPTP system due to the issue of disproportionality[7].

Iyengar (2017) also notes the disproportionality in the Lok Sabha and suggests that the house is unrepresentative because of the approach used to determine the winning candidate, in that the winning candidate is decided based purely on highest number of votes, even if that candidate is not preferred by majority of voters. Therefore, this approach becomes unrepresentative.

Mishra (2018, April) suggests that many elected representatives, as they receive votes below 50%, don't represent the majority of the population. If these candidates belong to the party which is forming the government, then the representativeness of such government becomes questionable. Therefore, disproportionality and concentration are serious issues which should be discussed in academic as well as policy environment.

The alternatives for the Indian electoral system should be investigated. The PR system reduces the disproportionality (Gallagher (1991), Powell and Vanberg (2000)). On the other hand, due to many parties, PR system can witness instability. Taagepera and Shugart (1989), however, suggest that over a period of time PR system will not be unstable, and a plural system will not remain unrepresentative.

The issue of disproportional representation, as well as unrepresentative houses, is not just a national-level problem. State assemblies witness disproportionality as well. In this paper, different indicators are formed to identify inefficient representation at the state assembly; further, the link between inefficient or disproportionate representation and the concentration of power is discussed.

II Data and Methodology

This paper uses the following indices to understand disproportionality and concentration (i.e. dominance of a particular party) in forming the government:

Indices	Description and usefulness in general sense	How it used in this paper	Interpretation
HHI	Herfindahl-Hirschman Index (HHI) is proposed by Hirschman (1958) to measure market concentration, thus helping to identify market concentration and competitiveness	In this paper, it is used to measure the concentration (i.e., dominance of a party) in forming the government.	HHI lies between 0 and 1. More the HHI, higher the concentration, which means a small number of parties are forming the government.
Gallagher Index	Gallagher Index is developed by Gallagher (1991) to measure the disproportionality between the seats won by the party and votes received by the party.	Gallagher Index is used to measure the disproportionality between the seats won by the party and votes received by the party.	Gallagher Index is always positive. A higher Gallagher Index suggests that there exists high level of disproportionality.
Gini Coefficient	Gini coefficient is given by Gini (1912). It is widely used to measure inequality i.e., income inequality, wealth inequality etc.	In this work, Gini coefficient is used to measure the inequality based on the seat/vote ratio. It measures the disparity among parties' seat/vote ratio.	Gini coefficient lies between 0 and 1. If it is higher then, it means few parties have high seats but have received the low vote share, which again suggests disproportionality.
Generalized Entropy	Generalized Entropy is used to measure income inequality.	In this work, Generalized Entropy is used to measure the inequality based on the seat/vote ratio.	GE (Generalized Entropy) is a measure of disparity. It has variations based on the weight provided (GE(-1), GE(0), GE(1), GE(2)). For all weights, a higher GE represents high disparity among parties based on seat/vote ratio, which suggests the disproportionality.

The HHI index as proposed by Hirschman (1958) is used to measure the market concentration. Laakso and Taagepera (1979) proposed the effective number of political parties to measure the degree of the coalition which is inverse of the HHI constructed on the basis of seat share (as well as vote share).

$\text{HHI} = \sum_{i=1}^{n}(s_i)^2$ where s_i is a seat share obtained by the i^{th} party.

HHI is constructed for Sixteen Indian States, for all elections held since the formation of these states. To construct the HHI, seat share is used to measure the concentration. In Indian democracy, the government is formed on the basis of seat-sharing, hence seats won by the parties play a more important in government formation than votes won by the parties. The higher the HHI, the higher will be a concentration of power -- very few parties are forming the government -- compared to a low level of HHI, where many parties are forming the government.

For representation inefficiency, Gallagher (1991) proposed the disproportionality index, also known as the Gallagher Index, which measures the disproportionality between the seats won by the party and votes received by the party.

$\text{Gallagher Index} = \frac{1}{2} * \sum_{i=1}^{n}(v_i - s_i)^2$ where v_i and s_i are percentage of vote and seat obtained by the i^{th} party.

Higher the Gallagher index, higher will be the disproportionality, which means the parties winning higher seats are actually receiving fewer votes. Therefore, the government formed by these parties can be viewed as relatively less representative. The Special Committee on Electoral Reform (a Canadian Parliamentary Committee) suggests that for Canada, the Gallagher Index should be 5 or lower. This Committee also recommends the government take efforts to reduce the Gallagher Index, so that more efficient (i.e., inclusive) representation can be brought into politics.

Adding to Gallagher Index, this paper attempts to construct additional measures of disproportionality by using inequality indices. The Gini coefficient is used to measure inequality[8]. The Gini coefficient can be calculated by using Lorenz Curve[9]. In income inequality, Lorenz curve is basically plotting cumulative income share against cumulative population share (the cumulative population share is on X-axis and the cumulative income share is on Y-axis). In the Lorenz curve, the 45-degree line is the line for equal distribution. The area between the curve and the 45-degree line represents the unequal distribution.

In figure 4, area A represents the income inequality while $\text{Gini Coefficient} = \frac{A}{A+B}$

In this work, the Gini coefficient is used to measure the inequal distribution of seats i.e., disproportionality between seats and votes.

Figure 4: Lorenz Curve for Income Inequality

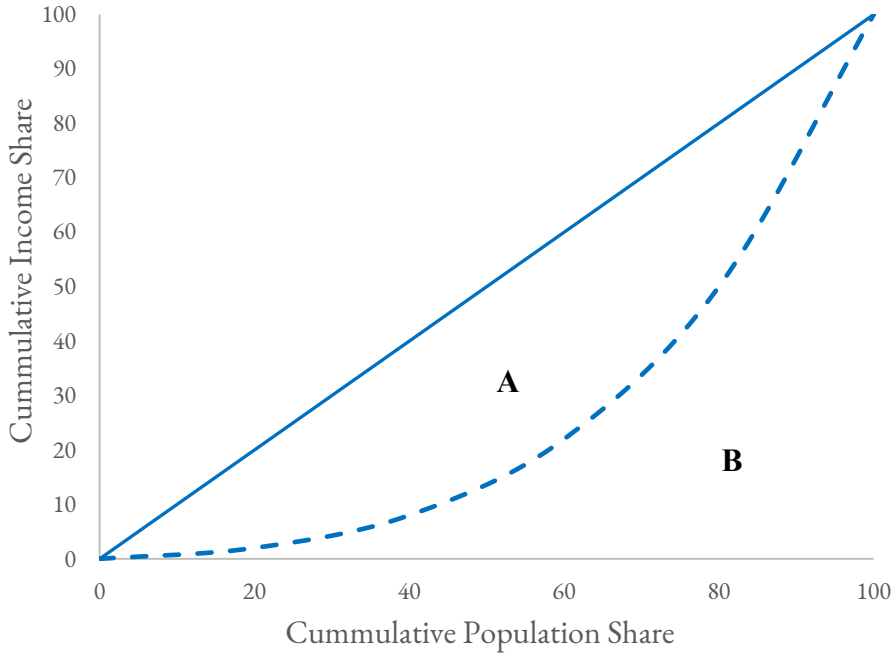
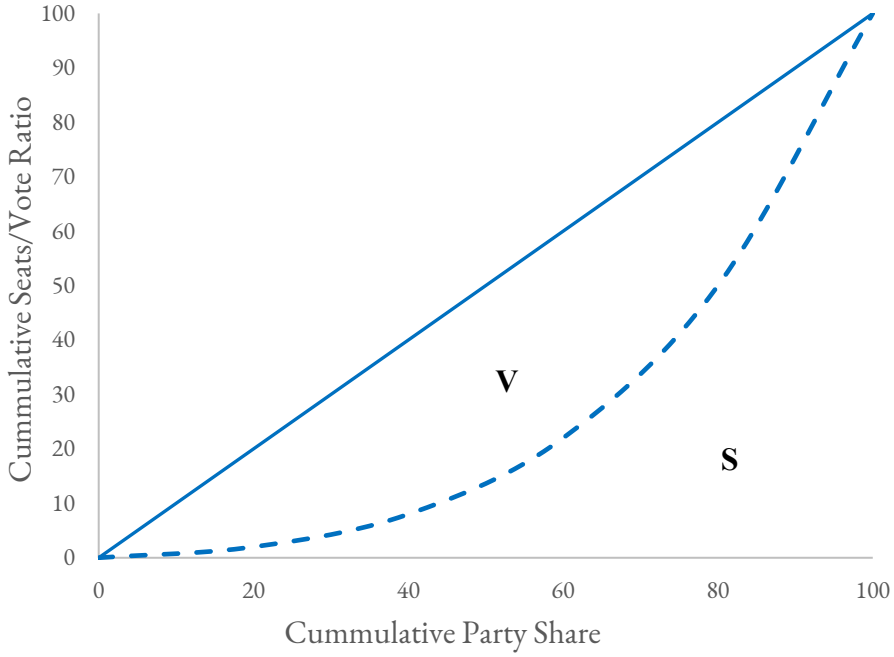


Figure 5: Lorenz Curve for Inefficient Representation



In above figure, $\text{Gini Coefficient} = \frac{V}{V+S}$. The equal distribution line represents the equal seat share is supported by the equal vote share while the area A shows the unequal distribution where the seat shares are higher for those who have less or equal votes compared to the others.

The Gini Coefficient is also written as

$$\text{Gini Co-efficient} = 1 + \left(\frac{1}{n}\right) - \left(\frac{2}{mn^2}\right)\sum_{i=1}^{n}(n - i + 1) * \frac{s_i}{v_i}$$

s_i is number of seats won by the i^{th} party, v_i is number of votes won by the i^{th} party, m is $\frac{\sum_{i=1}^{n}\frac{s_i}{v_i}}{n}$ i.e., average of total seats. And n is total number of parties.

Another widely used indicator of inequality is Generalized Entropy.

$$G.E.(\alpha) = \left(\frac{1}{\alpha * (1 - \alpha)}\right)\left[\frac{1}{N} * \left(\sum_{i=1}^{n}\left(\frac{\frac{s_i}{v_i}}{\left(\frac{s_i}{v_i}\right)_{mean}}\right)^{\alpha} - 1\right)\right]$$

The parameter α represents the weight given to distances between incomes at different parts of income distribution. The higher the values of α, the more weightage given to the upper end of distribution. For lower values of α, the index is more sensitive to changes in the lower end of distribution.

Widely used indices are $G.E.(0)$ and $G.E.(1)$
$G.E.(0)$ is known as Theil's L index and $G.E.(1)$ is known as Theil's T index.

$$G.E.(1) = \frac{1}{N} * \sum_{i=1}^{n}\left(\frac{\frac{s_i}{v_i}}{\left(\frac{s_i}{v_i}\right)_{mean}}\right) * \ln\left(\frac{\frac{s_i}{v_i}}{\left(\frac{s_i}{v_i}\right)_{mean}}\right)$$

And

$$G.E.(0) = \frac{1}{N} * \sum_{i=1}^{n}\ln\left(\frac{\left(\frac{s_i}{v_i}\right)_{mean}}{\frac{s_i}{v_i}}\right)$$

III Result

The level of disproportionality, on average, is very high for all states. The average Gallagher Index is more than 10 where average Gallagher Index, reaching a high of over 21 for Tamil Nadu. Bihar is at top as far as average Gini coefficient is concerned. HHI is moderate on average, with Madhya Pradesh showing the highest level of concentration at an HHI of 0.44.

Table 1: Descriptive statistics (Mean) - by (State)

State	HHI	Gallagher Index	GE (-1)	GE (0)	GE (1)	GE (2)	Gini
Andhra Pradesh	.415	17.998	1.711	.427	.278	.282	.345
Bihar	.284	16.375	1.685	.551	.379	.356	.437
Chhattisgarh	.371	15.871	1.375	.301	.148	.111	.21
Goa	.265	13.481	.546	.276	.19	.16	.29
Gujarat	.435	15.117	1.62	.403	.225	.179	.296
Haryana	.344	17.261	1.091	.435	.295	.264	.373
Himachal Pradesh	.433	16.885	.92	.346	.221	.183	.294
Jharkhand	.159	13.084	.902	.394	.264	.228	.367
Karnataka	.366	14.528	1.537	.398	.243	.208	.323
Kerala	.213	12.154	.798	.322	.224	.206	.329
Madhya Pradesh	.44	19.243	2.674	.54	.291	.238	.348
Maharashtra	.294	12.779	2.081	.466	.26	.214	.325
Orissa	.394	18.64	1.373	.436	.269	.224	.343
Punjab	.353	16.926	1.445	.481	.302	.26	.36
Rajasthan	.378	15.524	1.583	.45	.273	.229	.346
Tamil Nadu	.395	21.063	3.082	.649	.371	.326	.411
Uttar Pradesh	.347	18.441	2.945	.606	.368	.33	.427
Uttarakhand	.346	20.612	.879	.384	.25	.207	.333
West Bengal	.389	17.919	1.874	.518	.333	.298	.395

Data source: Author has formed the indices based on the statistics from the Election Commission of India.

Table 2: Average life of Assembly

State	Average Life of the assembly from formation	Average Life of the assembly since 1990	Average Life of the assembly since 2000	Average Life of the assembly since 2010
Andhra Pradesh	4.57	5	5	5
Bihar	4.57	5	5	5
Chhattisgarh	5	5	5	5
Goa	4.54	4.67	4.5	5
Gujarat	4.58	4.5	4.75	5
Haryana	4.33	4.57	4.75	5
Himachal	4.54	4.5	4.75	5
Jharkhand	4.67	4.67	4.67	4.5
Karnataka	4.69	4.83	4.75	5
Kerala	4.21	4.83	5	5
Madhya Pradesh	4.47	4.67	5	5
Maharashtra	4.75	4.83	5	5
Orissa	4.53	4.83	4.75	5
Punjab	4.64	5.33	5	5
Rajasthan	4.78	4.67	5	5
Tamil Nadu	4.45	4.5	5	5
Uttar Pradesh	4.13	3.86	5	5
Uttarakhand	5	5	5	5
West Bengal	4.33	4.83	5	5

Note: The average year of assembly is calculated based on the years one legislative assembly completes. If one assembly faces the sudden crisis and faces new election before completing 5 years, then the life of that assembly will be the years elapsed between formation of old assembly and new assembly after new election.

Figure 6 and figure 7 show the bivariate map for Indian states. The darker the shade, the higher the level of concentration as well as level of disproportionality in that state. Both HHI-Gallagher and HHI-Gini map suggest that most of the Indian states have a moderate level of coexistence of concentration and inefficiency.

Figure 6: Concentration-Inefficiency (HHI-Gallagher Index)

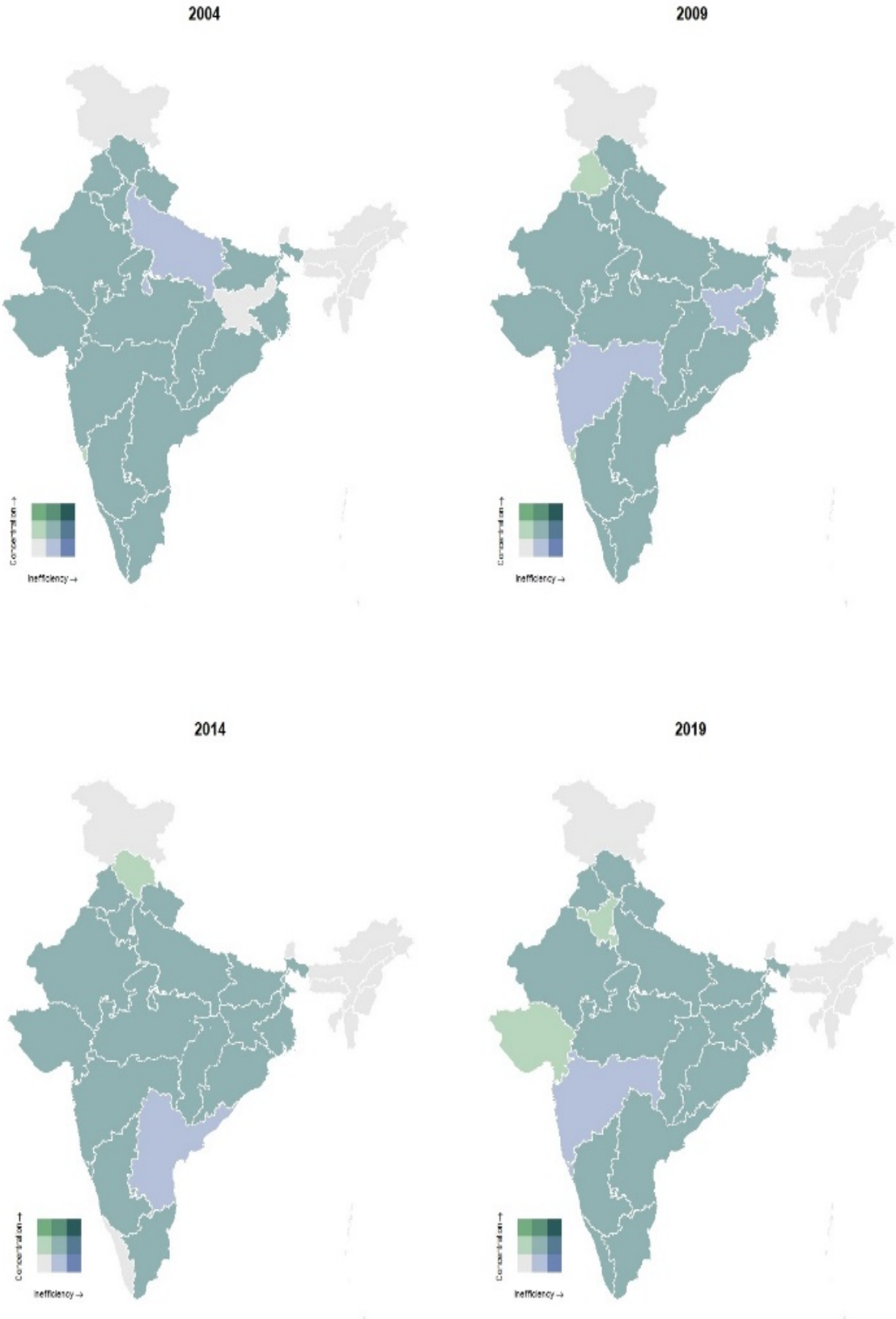
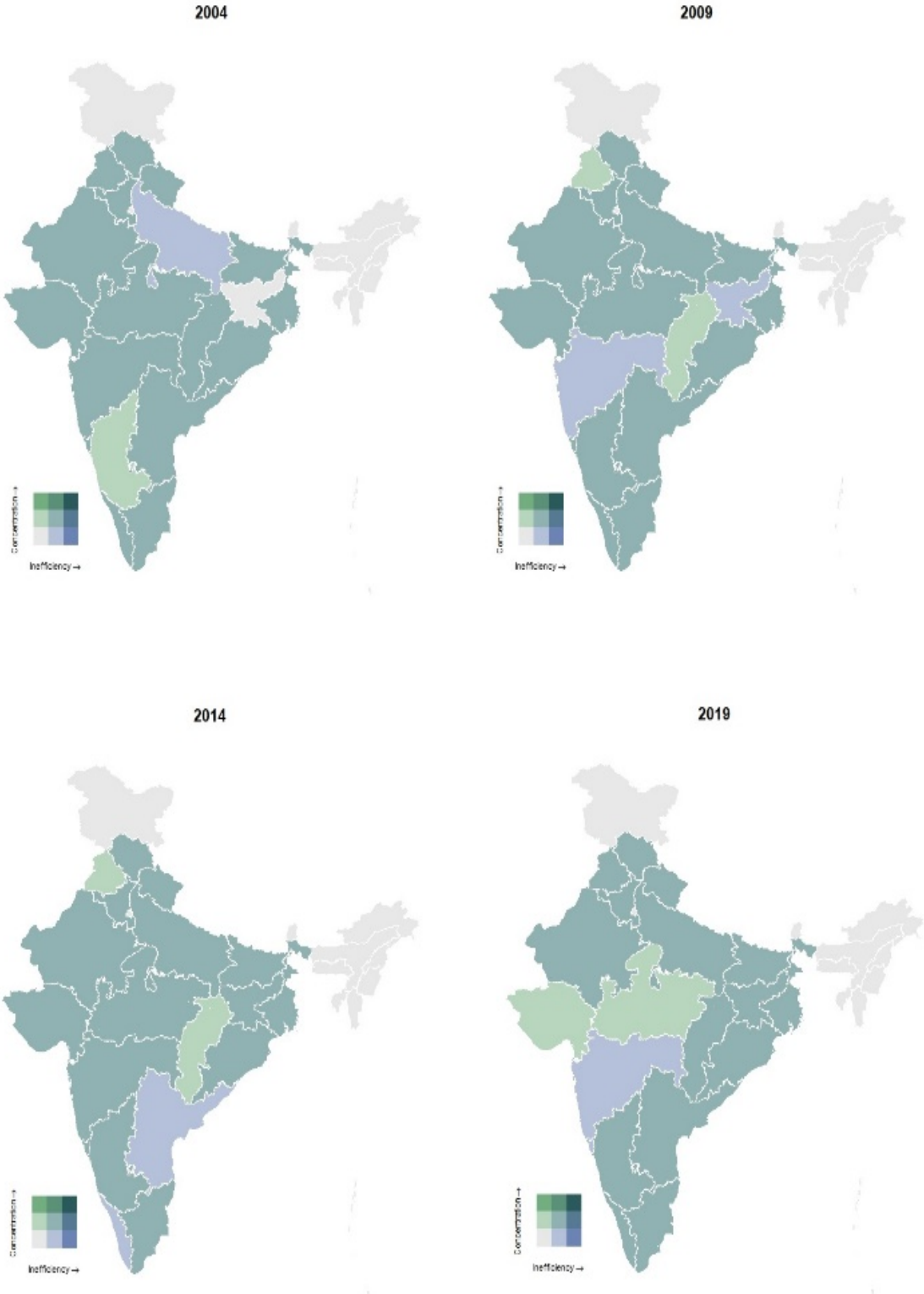
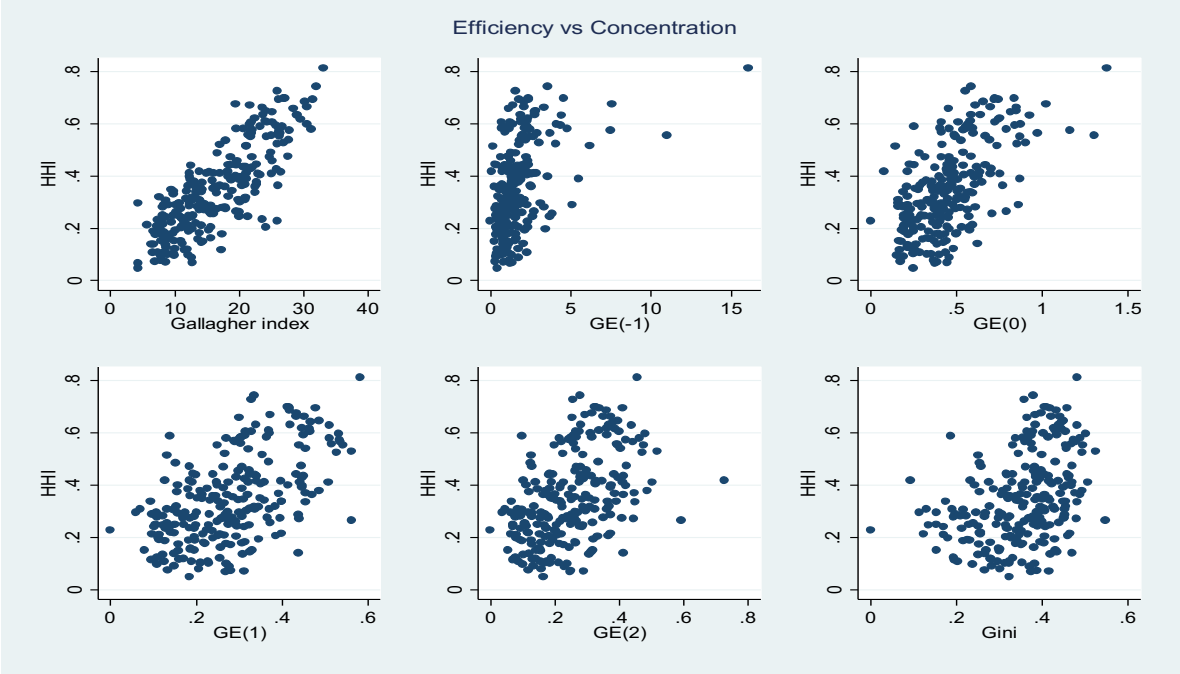


Figure 7: Concentration-Inefficiency (HHI-Gini Coefficient)



Data source: Author has formed the indices based on the statistics from the Election Commission of India.

Figure 8: Scatterplot between HHI and Inequality indices as well as Gallagher Index



Data Source: The author has constructed the Indices based on the election result statistics from the Election Commission of India.

The figure shows that there is a positive correlation between HHI and inequality indices.

Table 3 shows the correlation of the inequality indices and the Gallagher Index with HHI[10]. Correlation is significant, with the correlation being very high for Gallagher Index and low for Gini Coefficient.

Table 3: Pairwise correlations

Variables	Correlation with HHI (p-value)
Gallagher Index	0.818***
	(0.000)
GE (-1)	0.460***
	(0.000)
GE (0)	0.610***
	(0.000)
GE (1)	0.561***
	(0.000)
GE (2)	0.471***
	(0.000)
Gini	0.392***
	(0.000)

The correlation between HHI and all other indices formed to identify the disproportionality is positive. This suggests the coexistence of concentration and inefficiency in all states that form part of this sample.

The panel Graph for HHI and Gallagher Index (Figure 9 shown in the Appendix) follows the same pattern. HHI index and Gallagher Index is moving in an exact similar direction. When HHI reaches a peak for given state, the Gallagher Index also reaches a peak for the same state. HHI which measures the concentration index is calculated after government formation i.e., it reflects the post-government scenario. On the other hand, the Gallagher Index is constructed on the basis of the information available before government formation i.e., it reflects the post-election and pre-government formation scenario. In other words, the logical sequence is first Gallagher Index and then, after government formation, HHI comes into the picture. This means that first inefficiency (disproportionate seat share relative to vote share) is observed, then the concentration of power (share of seats held by the winning party) is observed.

The same pattern is observed for all other inequality indices. The GE (-1) has less variation compared to other Generalized Entropy indices. The possible reason is that GE (-1) is sensitive towards bottom seat distribution and that is not changing rapidly. While other indices are sensitive towards the top seat distribution, as top seat distribution is changing, GE (1), GE (2) and Gini coefficient are showing the variation which is similar to the concentration index. The representative inefficiency and concentration of power follow a similar pattern -- a pattern that is not good for Indian democracy.

IV Concluding Remarks: FPTP a dual problem

Under FPTP electoral system, India is witnessing the coexistence of disproportionality and concentration of power in government formation. As long as FPTP continues to be the electoral system of India, disproportionality is inevitable, as it is well noted fact that disproportionality is a feature of FPTP. The coincidence of this phenomenon with one party dominating the government further suggests that government itself is formed on the basis disproportionality.

The literature also suggests that a proportionate representation (PR) electoral system provides less disproportionality, but it comes with political instability. A stable government with efficient representation can be the best combination for any democracy, wherein votes are getting translated into representation in the house, and a relatively large share of the representatives are involved with governing the state.

Table 4 suggests the different combination of representation and concentration.

Table 4: Government Formation

Who forms the government	Political Concentration	Inefficient Representation	Nature of Political Power
Single party or very few parties with high seat share but comparably low vote share	Yes	Yes	The political power gets concentrated in hands of the parties which have no proper representation
Single Party or very few parties with high seat share as well as high vote share	Yes	No	The political power gets concentrated in hands of the parties which have fair representation
Coalition of the parties which together have majority seats but comparably low vote share	No	Yes	The political power gets shared by different parties which have no proper representation with less stability.
Coalition of the parties which together have a majority and do have an equivalent vote share	No	No	The political power gets shared by different parties which have fair representation but with less stability.

The trends analysis of Gallagher Index and HHI are showing the possible transformation of inefficiency in representation into the political concentration. And this coexistence of the poor representation and political concentration is creating a dual problem for Indian democracy.

Our analysis suggests that the FPTP electoral system is generating this disproportionality. And although a multi-party system exists in India, the recent trends show that one party is dominating the government formation. Under FPTP, the candidate with highest vote wins the election. But it is not necessary that the given candidate is preferred by the majority of voters (i.e., above 50% vote share). This is unrepresentative, and the unrepresentative nature of the result gets amplified when one party dominates the government formation.

This coexistence has to be addressed by making adjustments to the electoral system. The FPTP system does provide the benefits over PR system of giving stability to the government. Therefore, changing the existing system to PR system would also be problematic. A Mixed electoral system, such as Mixed-Member Proportional Representation (MMPR), has the potential to minimize the disproportionality without hurting the stability.

In 2019, South Korea adopted a MMPR system. In the house of 300 member, 253 seats are allocated for single-member constituencies through plurality voting, and 47 seats are reserved for PR voting. In the Indian context, this could take the form of keeping existing single member district election, while introducing more seats to maintain proportionality, by giving one more vote to each

voter. These additional seats can be allocated to parties based on their vote share in the second class of votes. These are new experiments which might have some issues in theory as well as in implementation, and a detailed discussion is needed to understand these further.

The association between concentration and inefficiency also needs more detailed investigation. The more detailed association can be identified after controlling the impact of social factors like polarization in society, conflicts between two political and social groups, and economic factors like change in prices during election years. The econometric analysis can be done, but the main problem is that the indices like HHI, Gallagher Index, Gini coefficient are formed for assembly years i.e., for years when new assembly is constituted. But the state-wise data for economic factors like prices, poverty and unemployment is available only for recent periods; therefore, controlling for such factors becomes difficult. Simply adding these factors with disproportionality indices will reduce the number of observations, which will make the model meaningless.

The average Gallagher Index for India since the first assembly election is 16.58 which is very high. This is a very high number, and its association with the concentration index is even more troubling. FPTP is, after all, the simplest method of electing representatives. Democracies around the world have witnessed the evolution of the electoral system and institutions. For India too, the electoral system should evolve, and if possible then alternatives for FPTP should be investigated again -- not just to correct the disproportionality, but also to ensure fair participation of the political parties in governance.

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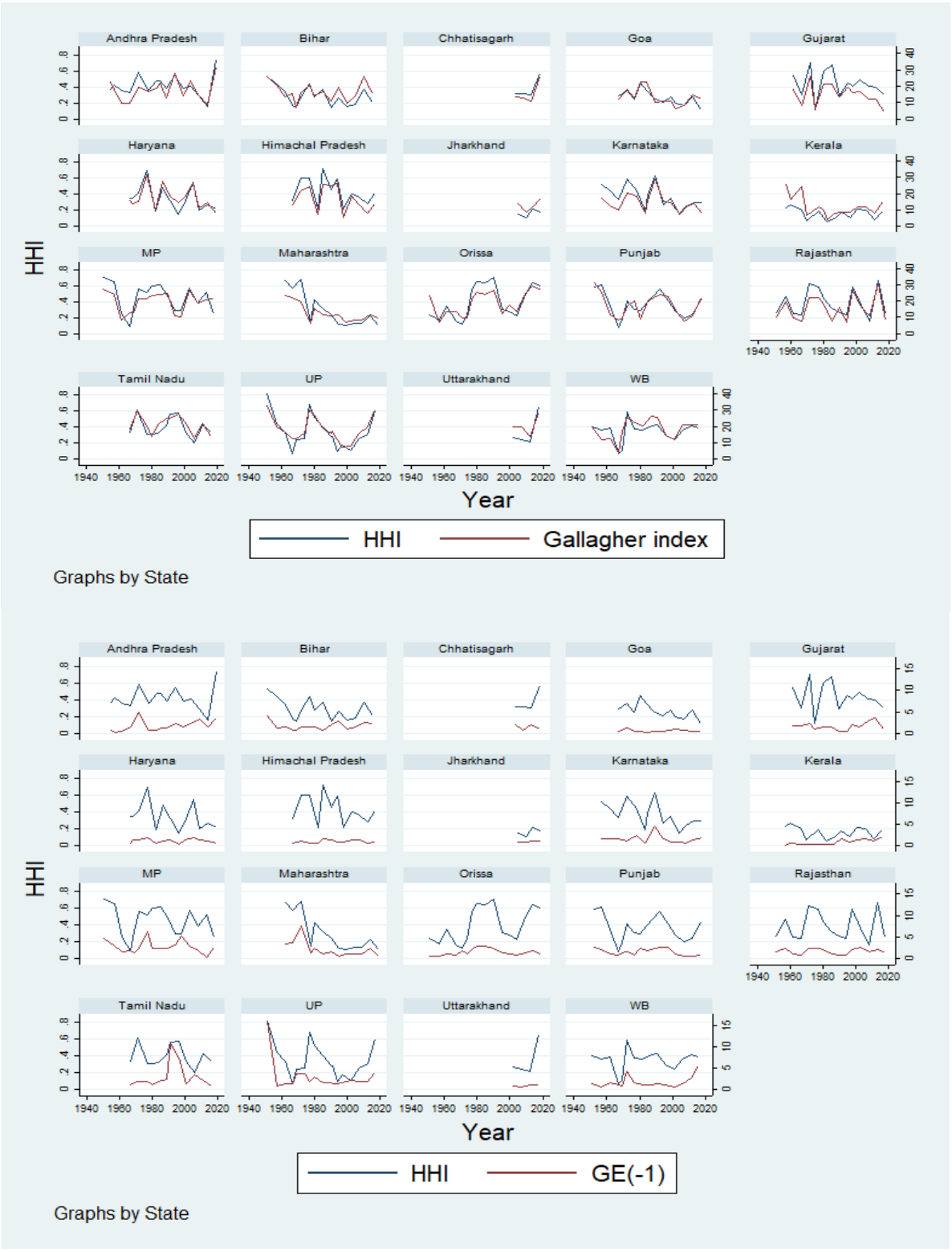
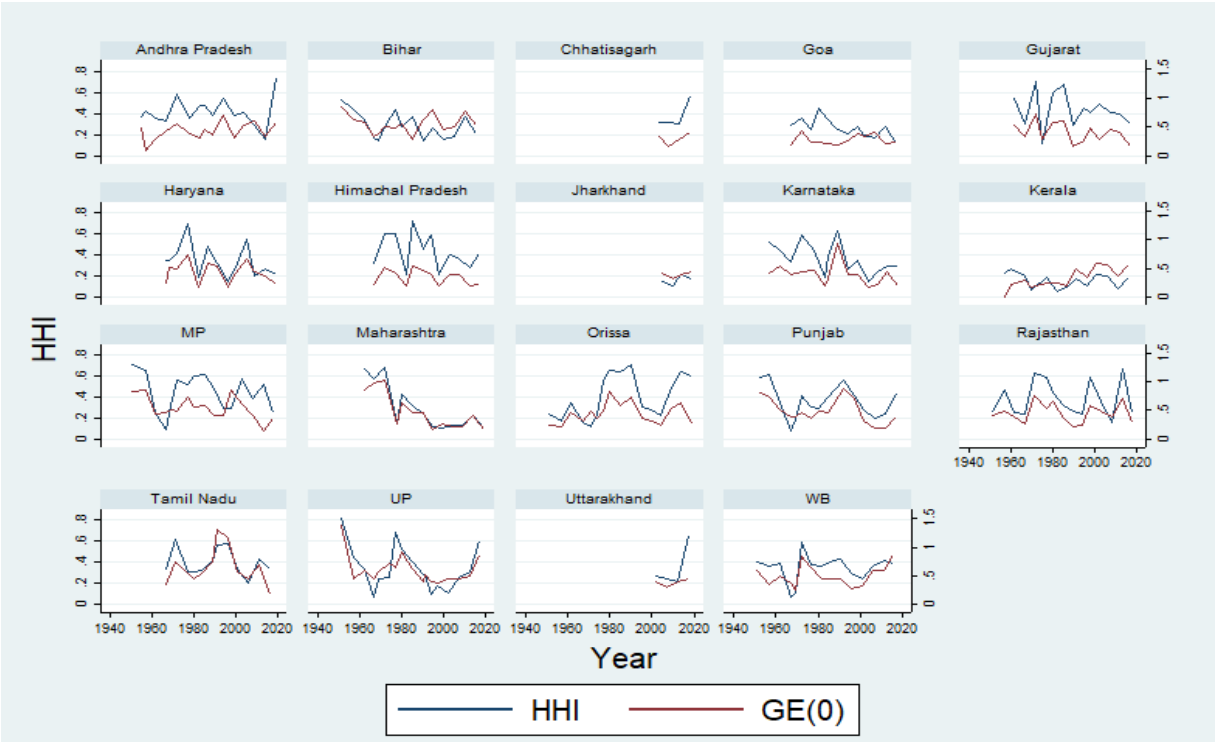
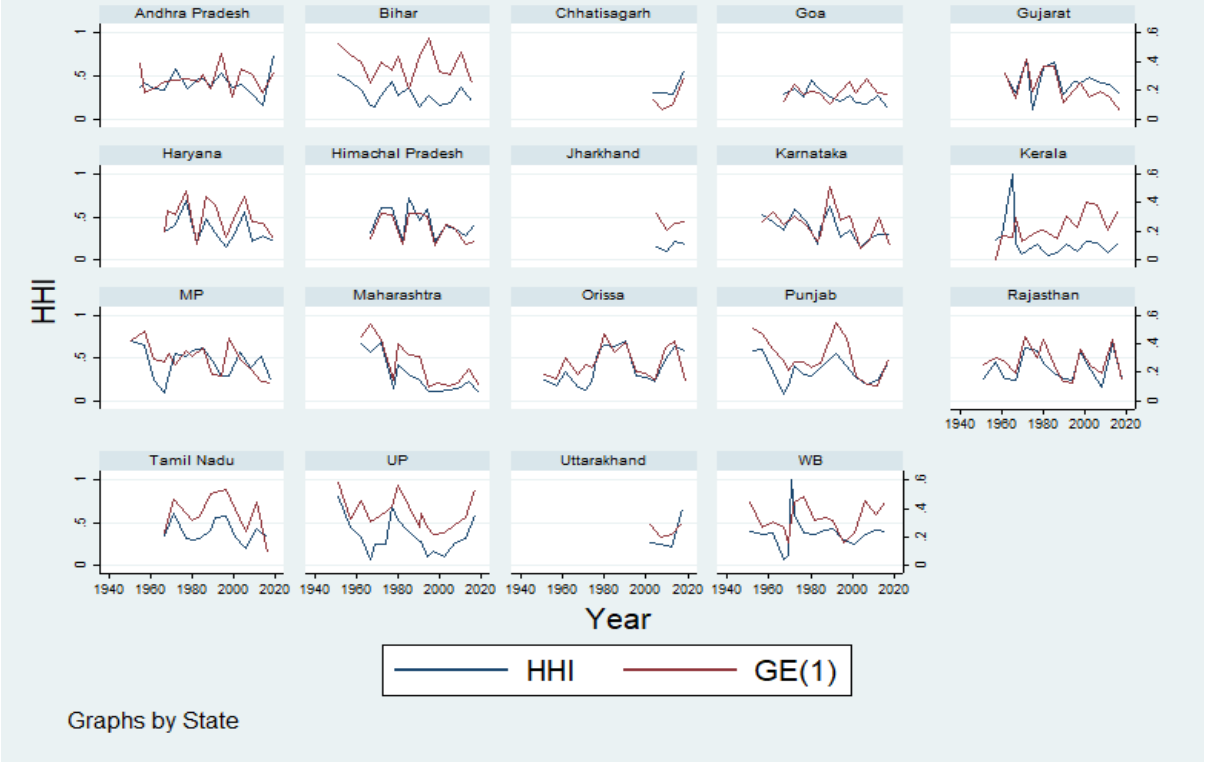
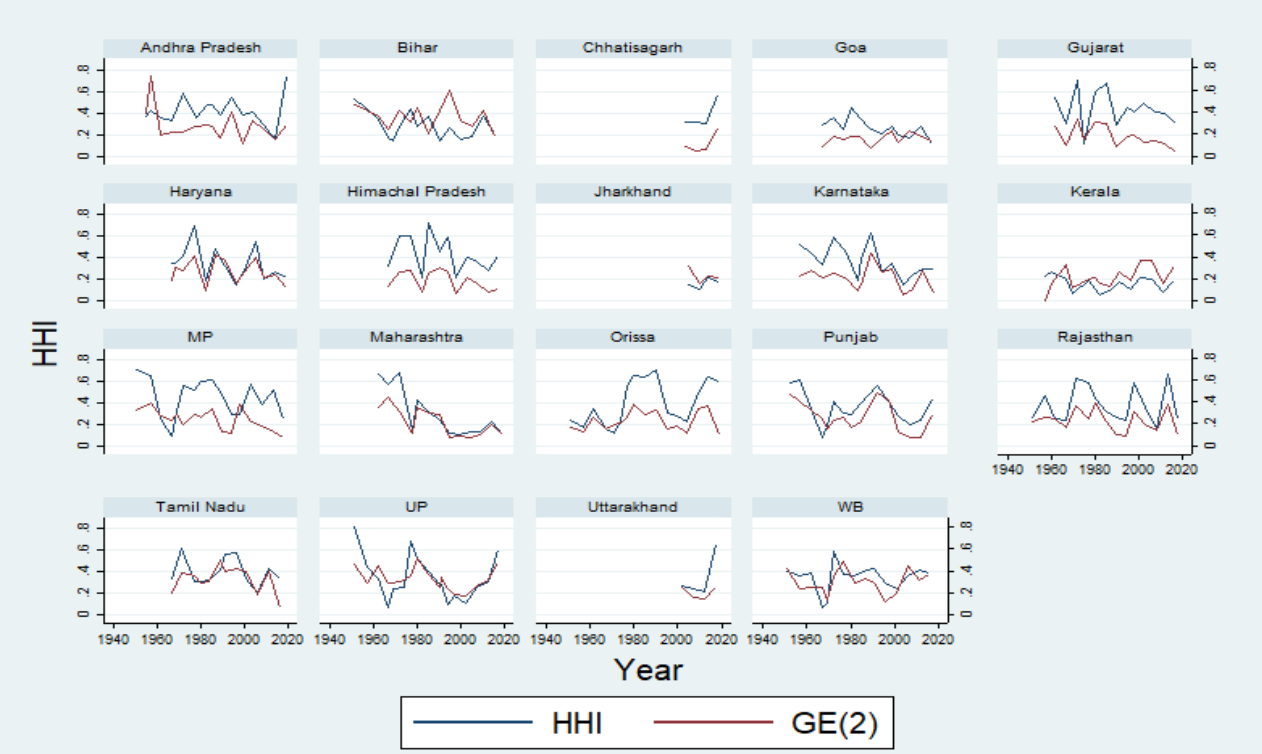
Appendix

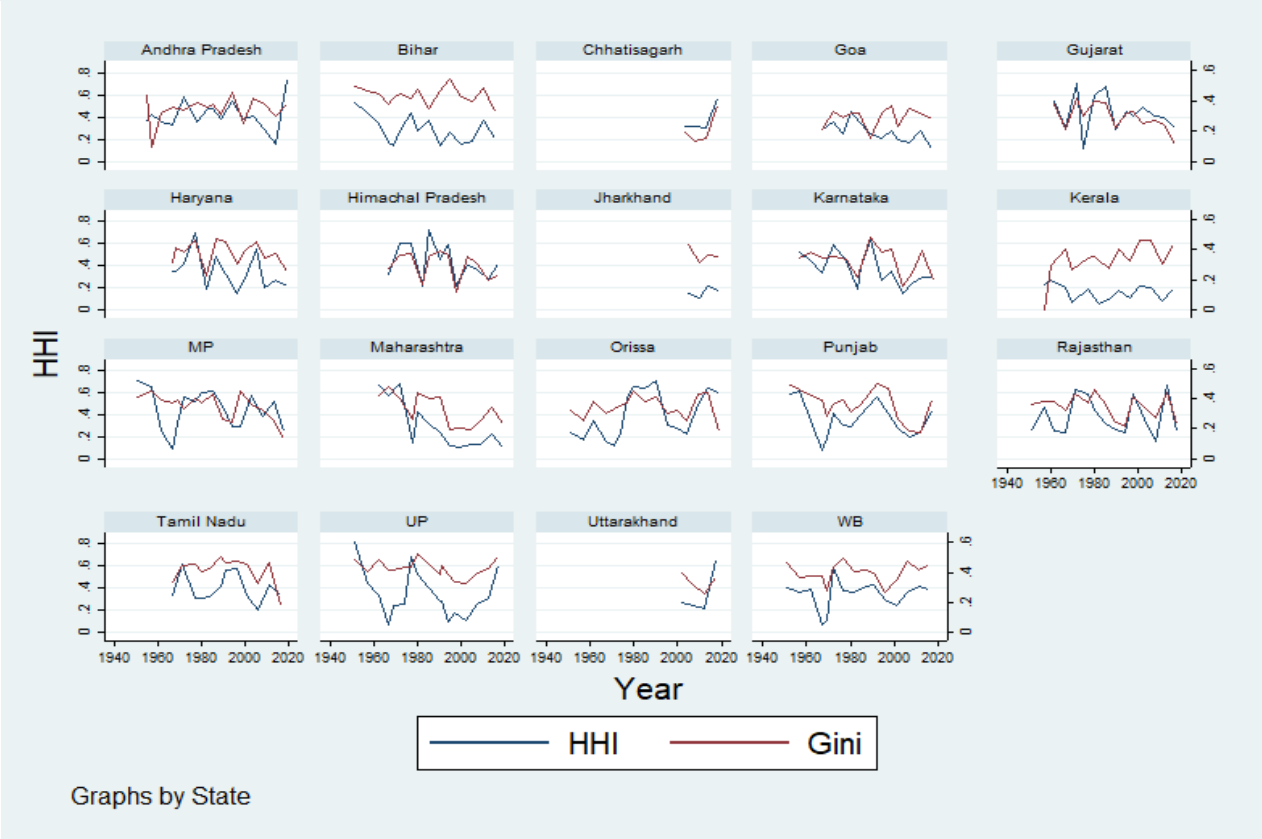
Figure 9: HHI vs Gallagher and Inequality Indices




Andhra Pradesh
Bihar
Chhatisagarh
Goa
Gujarat
Haryana
Himachal Pradesh
Jharkhand
Karnataka
Kerala
MP
Maharashtra
Orissa
Punjab
Rajasthan
Tamil Nadu
UP
Uttarakhand
WB
HHI
Year
HHI
GE(0)
Graphs by State


Andhra Pradesh
Bihar
Chhatisagarh
Goa
Gujarat
Haryana
Himachal Pradesh
Jharkhand
Karnataka
Kerala
MP
Maharashtra
Orissa
Punjab
Rajasthan
Tamil Nadu
UP
Uttarakhand
WB
HHI
Year
HHI
GE(1)
Graphs by State





Data Source: The author has constructed the Indices based on the election result statistics from the Election Commission of India.

Descriptive Statistics

Descriptive statistics – by (Year)

Year	HHI	Gallagher Index	GE (-1)	GE (0)	GE (1)	GE (2)	Gini
1951	.489	23.314	4.654	.719	.401	.343	.421
1952	.58	31.123	2.427	.793	.511	.462	.489
1955	.369	22.705	.742	.478	.392	.385	.442
1957	.43	18.951	1.186	.419	.289	.309	.32
1960	.275	16.49	.505	.233	.169	.155	.298
1961	.343	13.845	.981	.451	.298	.252	.383
1962	.389	13.558	1.512	.519	.34	.3	.4
1965	1	10.732	.433	.223	.154	.127	.275
1967	.244	13.097	1.154	.377	.248	.219	.344
1968	.351	14.035	1.322	.523	.348	.306	.414
1969	.2	11.735	1.54	.424	.268	.234	.358
1970	.074	6.788	.299	.175	.132	.117	.265
1971	.59	17.883	2.247	.67	.374	.294	.388
1972	.523	20.032	2.656	.589	.334	.276	.379
1974	.241	12.516	2.415	.535	.305	.26	.396
1975	.109	6.546	.832	.289	.188	.154	.298
1977	.459	21.627	1.82	.508	.333	.3	.399
1978	.312	13.812	1.403	.367	.223	.192	.328
1980	.422	18.158	1.741	.555	.357	.318	.409
1982	.204	10.454	.659	.269	.182	.157	.281
1983	.329	13.423	.574	.257	.194	.188	.289
1984	.339	21.686	1.034	.381	.266	.244	.371
1985	.481	18.943	1.535	.484	.306	.263	.377
1987	.329	20.657	.857	.408	.31	.294	.389
1989	.418	19.382	2.177	.56	.332	.295	.363
1990	.355	17.997	1.497	.431	.272	.237	.348
1991	.352	19.003	3.336	.66	.376	.333	.434
1992	.553	24.301	2.635	.871	.542	.476	.495
1994	.317	15.714	1.44	.399	.257	.222	.338

1995	.28	15.658	1.179	.39	.264	.25	.34
1996	.28	16.361	2.401	.492	.269	.222	.341
1997	.294	15.32	2.049	.536	.33	.296	.405
1998	.375	14.537	2.469	.534	.286	.235	.33
1999	.277	11.666	1.007	.334	.211	.179	.306
2000	.237	15.124	1.092	.391	.269	.251	.383
2001	.267	15.508	1.217	.492	.342	.323	.422
2002	.266	13.089	1.264	.352	.203	.162	.293
2003	.409	18.674	2.154	.451	.229	.18	.311
2004	.225	13.229	1.195	.287	.169	.143	.256
2005	.294	18.109	1.381	.531	.358	.324	.428
2006	.258	15.21	2.191	.547	.36	.335	.422
2007	.276	12.8	1.322	.367	.214	.173	.304
2008	.272	13.693	1.133	.293	.158	.12	.242
2009	.279	14.707	1.73	.453	.265	.22	.351
2010	.233	17.442	1.611	.551	.339	.289	.401
2011	.307	16.817	2.003	.551	.336	.293	.394
2012	.286	13.324	1.344	.316	.183	.152	.268
2013	.443	19.034	1.366	.396	.242	.208	.309
2014	.301	15.177	1.558	.431	.268	.235	.363
2015	.206	15.577	2.281	.529	.251	.181	.328
2016	.308	16.802	2.857	.546	.295	.252	.351
2017	.421	18.478	1.361	.388	.247	.215	.313
2018	.339	15.953	1.611	.318	.163	.125	.232
2019	.365	18.749	1.366	.332	.199	.161	.283

Descriptive statistics - by (State)

State	HHI	Gallagher Index	GE (-1)	GE (0)	GE (1)	GE (2)	Gini
Andhra Pradesh	.415	17.998	1.711	.427	.278	.282	.345
Bihar	.284	16.375	1.685	.551	.379	.356	.437
Chhattisgarh	.371	15.871	1.375	.301	.148	.111	.21
Goa	.265	13.481	.546	.276	.19	.16	.29
Gujarat	.435	15.117	1.62	.403	.225	.179	.296
Haryana	.344	17.261	1.091	.435	.295	.264	.373
Himachal Pradesh	.433	16.885	.92	.346	.221	.183	.294
Jharkhand	.159	13.084	.902	.394	.264	.228	.367
Karnataka	.366	14.528	1.537	.398	.243	.208	.323
Kerala	.213	12.154	.798	.322	.224	.206	.329
Madhya Pradesh	.44	19.243	2.674	.54	.291	.238	.348
Maharashtra	.294	12.779	2.081	.466	.26	.214	.325
Orissa	.394	18.64	1.373	.436	.269	.224	.343
Punjab	.353	16.926	1.445	.481	.302	.26	.36
Rajasthan	.378	15.524	1.583	.45	.273	.229	.346
Tamil Nadu	.395	21.063	3.082	.649	.371	.326	.411
Uttar Pradesh	.347	18.441	2.945	.606	.368	.33	.427
Uttarakhand	.346	20.612	.879	.384	.25	.207	.333
West Bengal	.389	17.919	1.874	.518	.333	.298	.395

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HHI	241	.356	.179	.049	1
Gallagher index	241	16.584	6.718	4.258	33.02
GE (-1)	241	1.677	1.6	0	16.036
GE (0)	241	.455	.213	0	1.376
GE (1)	241	.282	.12	0	.582
GE (2)	241	.247	.117	0	.727
Gini	241	.352	.093	0	.547

Notes

[1]Reynolds, Reilly and Ellis (2008) suggests for meaningful election, the elected representatives should have a role in the formation of the government as well as in the policy formation

[2]The idea behind plurality system is simple. After counting the votes, the party or candidate who won highest votes will be declared as winner. FPTP which is also known as plurality single-member district system is a subset of plurality system. In FPTP, candidate with the most vote is declared as winner but that candidate may not have absolute majority in terms of votes. (Reynolds, Reilly and Ellis (2008)). Proportional Representation however provides more importance to disparity between party's vote share and seat share in the house (Reynolds, Reilly and Ellis (2008)), Therefore in Proportional Representation, if one party receives 30% vote share then that party should also have approximately 30% seat share in the house. This is a noted difference in FPTP and Proportional Representation system. In FPTP, the disparity is higher as it considers highest votes only not absolute majority. Mixed system uses the characteristics of both proportional representation as well as plurality systems. For example, Mixed-Member Proportional Representation (MMPR). In this system, voters have to vote twice. One to decide the representative of the constituency and second for a political party. The seats in house filled firstly by the winner of constituency based on FPTP and secondly by parties candidates based on the vote share received by the parties.

[3]Refer to Reynolds, Reilly, and Ellis (2008)). In FPTP, every voter can give one vote and the candidate who receives the highest votes wins the election. Therefore, votes received by minor parties or parties representing a smaller section of the population can be seen as wasted votes as these votes don't get any "voice" and "value" in parliament. Therefore, even those voters who prefer smaller parties can vote for other parties rather than "wasting their votes".

[4] For the entire electoral systems database and a glossary of the different terms, see https://www.idea.int/data-tools/data/electoral-system-design

[5]Since each election, different parties receive different vote share as well as seat share, the top ten parties keep changing for every election.

[6]Refer to Law Commission of India, Report No. 255 Electoral Reforms March 2015

http://lawcommissionofindia.nic.in/reports/report255.pdf

[7]Refer to Report of the Committee on Electoral Reforms, May 1990, Government of India, Ministry of Law and Justice, Legislative Department, https://adrindia.org/sites/default/files/Dinesh%20Goswami%20Report%20on%20Electoral%20Reforms.pdf

[8]Gini coefficient is developed by Gini (1912)

[9]Lorenz (1905) develops the Lorenz curve to measure inequality.

[10] Pairwise correlation shows the strength of a linear relationship. It lies between -1 to 1. If it is zero then it means there is no relationship. If it is close to -1, then there exists an inverse relationship between the given variables, and it if it close to 1 then there exists a positive relationship. (Pairwise correlation only shows the power of linear relationship, it does not talk about causality).